

Customer No.: 92061-1  
Application No.: 10/711,623  
Docket No.: 11904-US-PA-1

## **REMARKS**

### **Present Status of the Application**

The Office Action objected to the specification because of the informalities. The Office Action rejected claims 1-7 under 35 U.S.C. 112, second paragraph. The Office Action also rejected claims 1 and 6 under 35 U.S.C. 102(b) as being anticipated by Hsu et al. (US 5,994,198; hereafter Hsu). The Office Action also rejected claims 2-5 and 7-10 under 35 U.S.C. 103(a), as being unpatentable over Hsu in view of DeBrosse (US 5,614,431; hereafter DeBrosse). Applicants have amended the specification and claims 1 and 6 to overcome the objection and the rejection under 35 U.S.C. 112 and respectfully submit that claims 1-10 have already patentably distinguished over the cited arts. Hence, the reconsideration of those claims is respectfully requested.

### **Discussion of Office Action Objection**

According to the Office Action, the specification is objected to because of the informalities. In response thereto, Applicants have amended paragraphs [0005], [0015], [0018], [0019] and [0024] to overcome this objection. No new matter has been added into the application by the amendment made herein.

### **Discussion of Office Action Rejections**

*The Office Action rejected claims 1-7 under 35 U.S.C. 112, second paragraph, as being indefinite for failing to particularly point out and distinctly claim the subject matter*

Customer No.: 92061-1  
Application No.: 10/711,623  
Docket No.: 11904-US-PA-1

*which applicant regards as the invention.*

In response thereto, the Applicants have amended claims 1 and 6 by adding "therein" before the terms "trench" and "trenches" in claims 1 and 6 respectively. No new matter has been added into the application by the amendment made herein. Hence, the withdrawal of this rejection is respectfully requested.

*The Office Action also rejected claims 1 and 6 under 35 U.S.C. 102(b) as being anticipated by Hsu et al. (US 5,994,198; hereafter Hsu) and asserted that Hsu discloses all claimed features of the present invention.*

Applicants respectfully traverse the rejections for at least the reasons set forth below.

It is well established that anticipation under 35 U.S.C. 102 requires each and every elements of the rejected claims must be disclosed exactly by a single prior art reference.

The independent claims 1 and 6 are allowable for at least the reason that Hsu fails to teach or disclose each and every features of the proposed independent claims 1 and 6.

AS stated above, claims 1 and 6 recite respectively:

Claim 1. A dynamic random access memory (DRAM) structure, comprising:

a substrate with a trench therein;

a capacitor formed inside the trench;

an active region surrounded by an isolation region formed over the substrate;

a word line formed over the substrate and passed through the active region, wherein an area in the active region covered by the word line serves as a channel region;

a pair of source/drain regions within the active region formed on each side of the word line such that the source/drain regions connect with

Customer No.: 92061-1  
Application No.: 10/711,623  
Docket No.: 11904-US-PA-1

the capacitor and a bit line respectively; and

**a doped region with dopants in a conductive type identical to that of the substrate formed on each side of the channel region adjacent to the isolation region.**

Claim 6. A dynamic random access memory (DRAM) structure, comprising:

a substrate with a plurality of trenches therein;

.....  
a plurality of bit lines running in a second direction formed over the substrate; and

**a plurality of doped regions formed in the substrate such that dopants inside the doped region has a conductive type identical to that of the substrate,**

wherein all four side edges of each active region have a pair of trenches such that the capacitor in one of the trenches in each pair of trenches along the second direction is coupled to the active region and the capacitors in the pair of trenches along the first direction are coupled to other active regions,

a pair of adjacent word lines passes through the active region and the two pairs of trenches along the first direction and the areas in the active region covered by the word lines serve as two channel regions, moreover, **the doped regions are formed on each side of each channel region adjacent to the isolation region, and**

each source/drain region within each active region is electrically connected to a capacitor and the common source/drain region is electrically connected to a bit line.

*(Emphasis added).* Applicants submit that claims 1 and 6 patently define over the cited arts for at least the reason that the cited art fails to disclose at least the features emphasized above.

More specifically, Hsu fails to teach or suggest the doped region located at each side of each channel region adjacent to the isolation region. In Hsu's application, the doped region labeled p+, which is deemed the doped region of the present invention by the Examiner, is located in the substrate under the STI (as shown in Fig. 9). Besides, Hsu

Customer No.: 92061-1  
Application No.: 10/711,623  
Docket No.: 11904-US-PA-1

further emphasizes that "the p+ field is formed to be fully contained within minimum width isolation regions (col. 4, lines 35-37)." by "performing an ion implant 40 with using a mask that lies in the middle of the isolation region (Fig. 5, col. 3, lines 51-56)".

However, in the present invention, the doped regions 122 are formed in a self-aligned manner on each side of the channel region adjacent to the isolation region by performing a tilt ion implantation (As shown in Fig. 2-8 and paragraph [0017]). It is clearly that Hsu never suggests nor teaches that the doped region labeled p+ is formed at each side of the channel region and is adjacent to the isolation region. Hence, people skilled in the art would not have motivation to modify Hsu's application by rearranging the location of the p+ doped region in order to obtain the same advantage as what the present invention possesses.

Therefore, Hsu substantially fails to teach each and every feature of claims 1 and 6 and therefore, Hsu cannot possibly anticipate the claimed invention as claimed in the proposed independent claims 1 and 6 in this regard.

*The Office Action also rejected claims 2-5 and 7-10 under 35 U.S.C. 103(a), as being unpatentable over Hsu in view of DeBrosse (US 5,614,431; hereafter DeBrosse).*

Since claims 2-5 and 7-10 are dependent claims which further define the invention recited in claims 1 and 6 respectively, Applicants respectfully assert that these claims also are in condition for allowance according to the same reasons as discussed above for the rejection 102. Thus, reconsideration and withdrawal of this rejection are respectfully requested.

Customer No.: 92061-1  
Application No.: 10/711,623  
Docket No.: 11904-US-PA-1

For at least the foregoing reasons, Applicant respectfully submits that independent claims 1 and 6 patently define over the prior art references, and should be allowed. For at least the same reasons, dependent claims 2-5 and 7-10 patently define over the prior art as well.

Customer No.: 92061-1  
Application No.: 10/711,623  
Docket No.: 11904-US-PA-1

### CONCLUSION

For at least the foregoing reasons, it is believed that the pending claims 1-10 are in proper condition for allowance. If the Examiner believes that a telephone conference would expedite the examination of the above-identified patent application, the Examiner is invited to call the undersigned.

Respectfully submitted,

Date: May 10, 2005



Belinda Lee

Registration No.: 46,863

Jianq Chyun Intellectual Property Office  
7<sup>th</sup> Floor-1, No. 100  
Roosevelt Road, Section 2  
Taipei, 100  
Taiwan  
Tel: 011-886-2-2369-2800  
Fax: 011-886-2-2369-7233  
Email: [belinda@jicgroup.com.tw](mailto:belinda@jicgroup.com.tw)  
[Usa@jicgroup.com.tw](mailto:Usa@jicgroup.com.tw)